



Douglas A. Forstie
Assistant State Engineer

ARIZONA DEPARTMENT OF TRANSPORTATION * MATERIALS GROUP

1221 NORTH 21ST AVENUE PHOENIX, ARIZONA 85009-3740 PHONE (602) 255 - 7231

POLICY AND PROCEDURE DIRECTIVE

TO: ALL MANUAL HOLDERS	PPD NO. 96-9
SUBJECT: PROVISIONAL SEAL COAT	EFFECTIVE DATE: March 1, 1996

GENERAL

This Policy and Procedure Directive supersedes P.P.D. No. 92-5.

This Policy and Procedure Directive gives general guidelines for the use of a provisional seal coat. The Engineer has the option to apply a provisional seal coat to any new bituminous pavement surface at the locations and the times as he/she directs. The Engineer may use a provisional seal coat on any lift of new bituminous pavement that is likely to be subject to precipitation or exposed during winter shutdown prior to the placement of any subsequent lifts of bituminous material. Although provisional seal coats are not contract items, they should be considered for use under the conditions described herein.

Metric (SI) units and values are given in this Policy and Procedure Directive with English units and values following in parentheses. Values given for metric and English units may be numerically equivalent (soft converted) for the associated units, or they may be given as rounded or rationalized values (hard converted). Either the metric or English units along with their corresponding values shall be used in accordance with applicable specifications.

REASONS FOR USE

In warm, sunny weather, the pneumatic action of traffic loads during and soon after construction will densify and seal the new pavement surface, reducing the air voids and making the pavement surface less permeable. However, if the pavement is subjected to moisture before the surface has a chance to densify and seal through pneumatic traffic action and warm dry weather, the pavement could strip and/or ravel. Application of a provisional seal coat to the new pavement surface before it is subjected to moisture will help alleviate this problem. Also, if a new asphaltic concrete pavement will go through a winter before receiving its final finishing course, a provisional seal coat may be needed to prevent water intrusion and damage to the pavement.

WHEN TO USE

In order for a provisional seal coat to be effective, the material should seal the surface. Good well-informed judgement should be exercised when deciding to direct the placement of a provisional seal. The following sources are valuable in obtaining the necessary information:

1. The percent asphalt content from acceptance tests on the new asphaltic concrete.
2. The percent air voids in the pavement (field voids), which can be obtained from field density and Rice tests.
3. If there is time, test strips approximately 1 meter by 10 meters (3 feet by 30 feet) can be placed using various application rates and types of bituminous material.

The following guidelines, based on field voids, can be utilized in forming a judgement as to when a provisional seal coat is needed for surfaces exposed for extended periods of inclement weather.

<u>VOID LEVELS</u>	<u>ACTION</u>
Field Voids < 6.0%.	Do not apply.
Field Voids 6.0% - 10.0%	Engineer's judgement
Field Voids > 10.0%	Apply

The Engineer should utilize a provisional seal when he/she deems it necessary to preserve the new asphaltic concrete from the adverse effects of moisture. It may be necessary to use a provisional seal frequently during rainy seasons; occasionally as required by weather conditions and traffic; once to protect the pavement during winter shutdown or to protect the final pavement surface; or, not at all. The Engineer should evaluate all conditions and information when deciding if a provisional seal is needed.

BITUMINOUS MATERIALS

The bituminous materials which may be used for a provisional seal are: emulsified asphalt, emulsified asphalt (special type), and emulsified recycling agent (ERA). Bituminous materials must meet the requirements of Section 1005 of the Specifications. If ERA is utilized, it shall be diluted one part water to one part ERA.

When selecting the type of bituminous material to use, the following may be helpful:

EMULSIFIED OR EMULSIFIED (SPECIAL) ASPHALTS

POSITIVE ASPECTS

- 1) Will not soften the new asphaltic concrete significantly.
- 2) Helps seal the surface of the new asphaltic concrete and prevent water intrusion.
- 3) In most cases, a tack coat will not be needed where an emulsified asphalt provisional seal coat was applied.
- 4) May be more available when needed on short notice due to weather or construction conditions, especially if it is being used for Tack Coat.
- 5) Can be effective in special cases or problems such as rocky or coarse pavement surface or very high air voids in the mix caused by low asphalt content and/or poor compaction when it is not desirable to take other corrective action.

NEGATIVE ASPECTS

- 1) Can be worn off by traffic in wet weather.
- 2) May not break and adhere to the asphaltic concrete surface well under cold and/or wet weather conditions.
- 3) Can cause a slick, shiny surface.
- 4) Can migrate and fill air voids in the lower portion of a lift of asphaltic concrete placed over it, especially if applied in excessive amount.
- 5) Can cause a water trap in the top portion of the new asphaltic concrete by making a very thin impervious seal on top which prevents any water that gets into the air voids below from escaping.

EMULSIFIED RECYCLING AGENTS

POSITIVE ASPECTS

- 1) Will penetrate, fill air voids and soften the top portion of the new asphaltic concrete [from 3 to 6 millimeters (1/8 to 1/4 inches)] to produce a dense surface if pneumatic traffic is available before moisture is encountered, which will help prevent water intrusion.
- 2) Can be applied more successfully under cold and/or wet conditions and will penetrate the surface of the new asphaltic concrete better and will not be washed off by water and traffic as easily.
- 3) In some cases, a tack coat will not be needed where an emulsified recycling agent provisional seal coat was applied; however, this determination must be made on an individual basis.
- 4) ERA-25 can be effective in special cases or problems such as a rocky or coarse pavement surface or a very high air void content in the asphaltic concrete caused by low asphalt content and/or poor compaction when it is not desirable to take other corrective action.

NEGATIVE ASPECTS

- 1) Can cause a slick, shiny surface and instability in the portion of the asphaltic concrete it penetrates.
- 2) Needs pneumatic compaction to perform well.
- 3) Will fill air voids in the top portion of the asphaltic concrete it is applied to.
- 4) Not available on short notice in some cases.
- 5) When used in excessive amounts or where conditions are wrong, it can increase or cause bleeding or instability.

The table below shows approximate application rates. The Engineer should direct the application rate he/she determines to be most beneficial to the new asphaltic concrete, according to type and dilution.


TYPE OF BITUMINOUS MATERIAL	APPROXIMATE APPLICATION RATE [liters per square meter (gal./sq. yd.)]
Emulsified Asphalt (Special Type)	0.35 (0.08)
Emulsified Asphalt (Other than Special Type)	0.25 (0.06)
Emulsified Recycling Agent (diluted with one part water to to one part ERA)	0.35 (0.08)

The Engineer may direct that a sand blotter be applied in one or more applications for a total application of approximately 1 kg/m² (2 pounds per square yard).

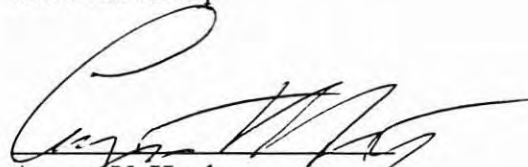
SUMMARY

The provisional seal coat is to be utilized only when and where it is needed. If used where it is not needed, the provisional seal coat can be harmful to the pavement. If used properly it can help prevent surface stripping and ravelling in new pavement surfaces. A great deal of attention must be paid to the properties of the new asphaltic concrete pavement and the weather conditions in deciding if a provisional seal coat is needed, and if needed, what type and what application rate will do the best job. Good well-informed judgement must be used when working with provisional seal coats. The decisions necessary will need to be made at the project and district level for each project and its condition, however Materials Group personnel will lend any assistance as requested.

Payment to contractors for provisional seal coat will be made by change order.


Douglas A. Forstie
Assistant State Engineer
Materials Group

Approved by:


August V. Hardt
Deputy State Engineer
Highway Operations Group